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EXAMINER

ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/661,638

Applicant(s)

HIRAIWA ET AL.

Examiner

Lois Zheng

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. Claims 1-8 are currently under examination.

Means-Plus-Function Language

2. Instant claims 2, 4 and 7-8 contain following terms written in means-plus-function format, and has been interpreted as follows:

“first adsorption means”(claims 2 and 7) is in proper means-plus-function format is defined as two adsorption towers in the second compartment as described in the last paragraph bridging pages 7-8 of the specification and in Fig. 1(i.e. numerals 14, 14a and 14b).

“second adsorption means”(claims 2 and 8) is in proper means-plus-function format is defined as two adsorption towers in the third compartment as described in the second full paragraph on page 8 of the specification and in Fig. 1(i.e. numerals 15, 15a and 15b).

“reservoir means”(claim 4) is in proper means-plus-function format is defined as a buffer tank in the second compartment as described in the second full paragraph on page 6 of the specification and in Fig. 1(i.e. numeral 20).

“pressurizing means”(claim 4) is in proper means-plus-function format is defined as a compressor in the second compartment as described in the second full paragraph on page 6 of the specification and in Fig. 1(i.e. numeral 21).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Moulthrop, Jr. et al. US 5,980,726(Moulthrop).

Moulthrop teaches an electrochemical apparatus comprising a box-shaped body (Fig. 1 enclosure 3). The box-shaped body is partitioned into two separate compartments, therein one of the compartments comprises an electrolyzer(Fig. 1 numeral 30). The preamble “a fluorine gas generator” is merely stating the intended use for the claimed apparatus, therefore, does not lend patentability of the instant claim.

Therefore, Moulthrop anticipates instant claim 1.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/77412.

The rejection grounds are based on WO 01/77412. However, the examiner will rely on the teachings of Tojo et al. US 6,518,105 B2(Tojo'105) when discussing the

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details of the rejection since Tojo'105 is the National Stage Entry and an English equivalent of WO 01/77412 which is in Japanese.

Tojo'105 teaches a fluorine gas generator for generating high purity fluorine gas by electrolysis of a mixed molten-salt comprising hydrogen fluoride(abstract). The fluorine gas generator of Tojo'105 comprises an electrolytic cell which is separated into an anode chamber and a cathode chamber(abstract, Fig. 1 numerals 5 and 7). Tojo'105 further teaches that the fluorine gas generator comprises absorption towers to downstream from the hydrogen and fluorine gases outlet to remove excess HF from the hydrogen gas and the fluorine gas(col. 6 lines 14-19). Fig. 1 of Tojo'105 appears to shown that the fluorine gas generator has box-shaped body.

Regarding claim 1, even though Tojo'105 does not explicitly teach that the claimed at least two compartments, it would have been obvious to one of ordinary skill in the art to have split the fluorine gas generator into three different compartments(i.e. one for the electrolyzer, one for the post treatment process of the hydrogen gas from the cathode chamber, and one for the post treatment process of the fluorine gas produced from the anode chamber) in order to minimize the potential negative affect of a mishap in any of the electrolysis and post treatment processes(i.e. such as gas leakage, fire or explosions) on each other.

Therefore, instant claim 1 does not distinguish from the teachings of Tojo'105.

7. Claims 2-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/77412 in view of Marumo et al. US 4,790,859(Marumo).

The teachings of Tojo'105 are discussed in paragraph 6 above. However, the absorption towers of Tojo'105 do not explicitly read the claimed first and second adsorption means.

Marumo teaches an apparatus for separating gaseous mixtures containing a first and a second gas having different chemical compositions(abstract). The gas separation apparatus of Marumo teaches using two adsorption towers to provide an efficient separation of a gas mixture(col. 2 lines 41-42, col. 11 lines 53-55). Marumo further teaches that the first adsorption tower is being used to separate the gas mixture while the adsorbent in the second adsorption tower is being regenerated. Later on, the process is switch where the second adsorption tower is used to separate the gas mixture while the adsorbent in the first adsorption tower is being regenerated(col. 12 lines 6-63).

Regarding claim 2, it would have been obvious to one of ordinary skill in the art to have incorporated the gas mixture separation apparatus of Marumo with the dual adsorption tower setup into the fluorine gas generator of Tojo'105 to remove the HF from the hydrogen gas and the fluorine gas in order to achieve efficient separation of the gas mixture as taught by Marumo and to minimize the adsorption tower down time by using one adsorption tower for gas separation while allowing the adsorbent regeneration to take place in the other adsorption tower as taught by Marumo.

Regarding claim 3, Tojo'105 further teaches an exhaust opening(Fig. 1 numeral 19) to provide controlled atmosphere for the interior of the fluorine gas generator(col. 8 lines 16-18). Therefore, it would have been obvious to one of ordinary skill in the art to

have incorporated an exhaust opening(i.e. suction opening) to each of the three compartments of the fluorine gas generator in order to provide a controlled interior atmosphere in each of the electrolyzer and the hydrogen and fluorine gas post-treatment processing sections.

Regarding claim 4, Tojo'105 further teaches a buffer tank(Fig. 1 numeral 44) and a pressurizer(Fig. 1 numeral 42). Even though the buffer tank(i.e. reservoir means) and the pressurizer Tojo'105 are located outside of the box-shaped housing instead of within the second compartment as claimed and the pressurizer of Tojo'105 locates upstream of the buffer tank instead of downstream from the buffer tank as claimed, one of ordinary skill in the art would have found the claimed reservoir and pressurizer locations obvious since it is well settled that rearrangement of parts is an obvious matter of design choice. In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975). In addition, the buffer tank and the pressurizer of Tojo'105 differs from the instant invention only in their locations, which is unpatentable because shifting the locations of the buffer tank and the pressurizer of Tojo'105 would not have modified the operation of the buffer tank and the pressurizer. In re Japikse, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). See MPEP 2144.04. Furthermore, it would have been obvious to one of ordinary skill in the art to have incorporated the buffer tank and the pressurizer of Tojo'105 in view of Marumo inside the same compartment for post-treatment of fluorine gas discharge(i.e. second compartment) in order to protect the buffer tank and the pressurizer from potentially hazardous environment and conditions.

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Regarding claim 5, Tojo'105 teaches that a heater is used to provide proper heating of the electrolytic cell and the heater make take any form(col. 6 lines 53-67). Even though Tojo'105 in view of Marumo do not explicitly teach that the heater is water heating device as claimed, one of ordinary skill in the art would have found it obvious to have used an water heating device in the heater of Tojo'105 in view of Marumo since an water heating device is an well known low cost heating device.

Regarding claim 6, even though Tojo'105 in view of Marumo do not explicitly teach that the electrolyzer is mounted on a transporting member, one of ordinary skill in the art would have found it obvious to have mounted the electrolytic cell of Tojo'105 in view of Marumo on a transporting member capable of moving the electrolytic cell in and out of the fluorine gas generator in order to allow easy access to the electrolytic cell for routine maintenance such as cleaning and replacement of parts.

Regarding claims 7-8, the adsorption columns of Tojo'105 in view of Marumo are switchable as claimed. Even though Tojo'105 in view of Marumo do not explicitly teach that the adsorption columns are mounted on transporting members as claimed, one of ordinary skill in the art would have found it obvious to have mounted the adsorption columns of Tojo'105 in view of Marumo on transporting members capable of moving the adsorption columns in and out of the first and second compartments in order to allow easy access to the adsorption columns for routine maintenance such as cleaning and replacement of parts.

8. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. US 2004/0007457 A1(Tojo'457).

Tojo'457 teaches a fluorine gas generator comprising an electrolytic cell and two adsorption columns to remove HF from hydrogen gas produced from the cathode chamber and two absorption columns to remove HF from fluorine gas produced from the anode compartment (abstract, Fig. 1 numerals 14, 14a, 14b, 15, 15a, 15b).

Regarding claim 1, even though Tojo'457 does not explicitly teach the claimed box-shaped body, one of ordinary skill in the art would have found it obvious to have incorporated a housing for the fluorine gas generator of Tojo'457 in order to protect the equipments of the fluorine gas generator from potentially hazardous environment. Therefore, the housing for the fluorine gas generator of Tojo'457 reads on the claimed body. The shape of the housing would have been an obvious engineering choice to one of ordinary skill in the art since it is well settled that change in shape is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). See MPEP 2144.04. In addition, even though Tojo'457 does not explicitly teach that the claimed at least two compartments, it would have been obvious to one of ordinary skill in the art to have split the fluorine gas generator into three different compartments (i.e. one for the electrolyzer, one for the post treatment process of the hydrogen gas from the cathode chamber, and one for the post treatment process of the fluorine gas produced from the anode chamber) in order to minimize the potential negative affect of a mishap in any of the electrolysis and post treatment processes (i.e. such as gas leakage, fire or explosions) on each other.

9. Claims 2 and 4-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. US 2004/0007457 A1(Tojo'457) in view of Marumo.

The teachings of Tojo'457 are discussed in paragraph 8 above. The adsorption towers of Tojo'457 for removing HF from hydrogen gas reads on the claimed second adsorption means.

However, the absorption towers for removing HF from fluorine gas as taught by Tojo'457 do not explicitly read the claimed first adsorption means.

The teachings of Marumo are discussed in paragraph 7 above.

Regarding claim 2, it would have been obvious to one of ordinary skill in the art to have incorporated the gas mixture separation apparatus of Marumo with the dual adsorption tower setup into the fluorine gas generator of Tojo'457 to remove the HF from the fluorine gas in order to achieve efficient separation of the gas mixture as taught by Marumo and to minimize the adsorption tower down time by using one adsorption tower for gas separation while allowing the adsorbent regeneration to take place in the other adsorption tower as taught by Marumo.

Regarding claim 4, Tojo'457 further teaches a buffer tank located downstream of the fluorine gas discharge(page 4 paragraph 0039) and a compressor unit(Fig. 1 numeral 42) as claimed.

Regarding claim 5, Tojo'457 teaches that a warm water heater is used to provide proper heating of the electrolytic cell(page 3 paragraph 0030) as claimed.

Regarding claim 6, even though Tojo'457 in view of Marumo do not explicitly teach that the electrolyzer is mounted on a transporting member, one of ordinary skill in

the art would have found it obvious to have mounted the electrolytic cell of Tojo'457 in view of Marumo on a transporting member capable of moving the electrolytic cell in and out of the fluorine gas generator in order to allow easy access to the electrolytic cell for routine maintenance such as cleaning and replacement of parts.

Regarding claims 7-8, the adsorption columns of Tojo'457 in view of Marumo are switchable as claimed. Even though Tojo'457 in view of Marumo do not explicitly teach that the adsorption columns are mounted on transporting members as claimed, one of ordinary skill in the art would have found it obvious to have mounted the adsorption columns of Tojo'457 in view of Marumo on transporting members capable of moving the adsorption columns in and out of the first and second compartments in order to allow easy access to the adsorption columns for routine maintenance such as cleaning and replacement of parts.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo'457 in view of Marumo and further in view of Tojo'105.

The teachings of Tojo'457 in view of Marumo are discussed in paragraphs 8-9 above.

However, Tojo'457 in view of Marumo do not teach the claimed suction opening in teach of the three compartments.

The teachings of Tojo'105 are discussed in paragraphs 6-7 above. Tojo'105 further teaches an exhaust opening(Fig. 1 numeral 19) to provide controlled atmosphere for the interior of the fluorine gas generator(col. 8 lines 16-18).

Regarding claim 3, it would have been obvious to one of ordinary skill in the art to have incorporated an exhaust opening(i.e. suction opening) as taught by Tojo'105 into each of the three compartments of the fluorine gas generator of Tojo'457 in view of Marumo in order to provide a controlled interior atmosphere in each of the electrolyzer and the hydrogen and fluorine gas post-treatment processing sections as taught by Tojo'105.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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